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Automated Geospatial Watershed Assessment (AGWA) Tool: Watershed Modeling in ArcView 3.x, 9.x, and on the Web

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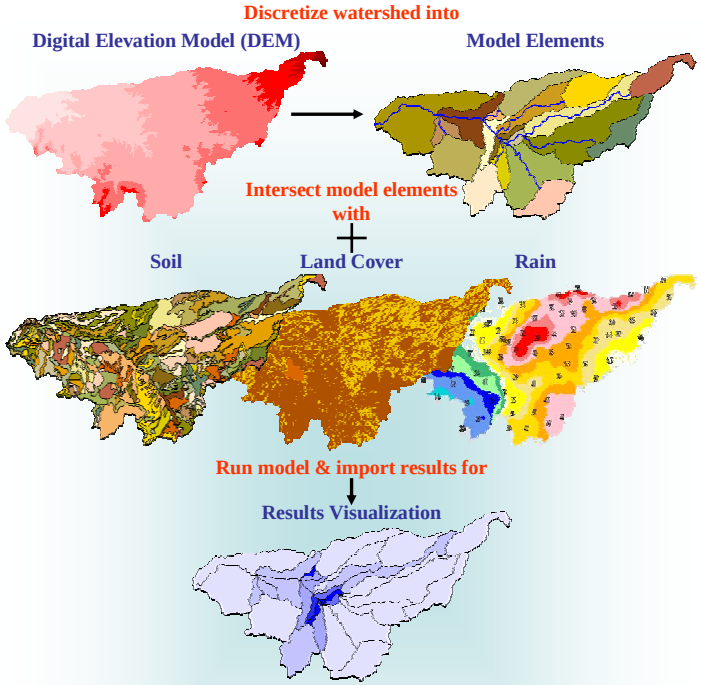
Introduction: The Automated Geospatial Watershed Assessment Tool (AGWA) is a GIS-based watershed modeling tool. AGWA was developed as a multipurpose hydrologic analysis system for use by watershed, water resource, land use, and natural resource managers and scientists for developing watershed and basin-scale studies. AGWA is currently available for ArcView 3.x as a stand-alone extension or as an extension for the EPA's Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) tool (http://www.epa.gov/OST/BASINS/). Additionally AGWA has been incorporated into the Council for Regulatory Environmental Modeling (http://cfpub.epa.gov/crem/crem_report.cfm?deid=75821) and used by EPA, in addition to other models, to establish and implement criteria so that model-based decisions support the Agency's regulatory framework and guidelines. Development of AGWA version 2.0 for ArcView 9.x and DotAGWA for Web-based delivery is progressing with beta releases scheduled for the fourth quarter 2005.

Description: Currently, AGWA supports the parameterization, application, and results visualization of two watershed hydrologic models, i.e. the Soil and Water Assessment Tool (SWAT; Arnold et al., 1994: http://www.brc.tamus.edu/swat/) and the KINematic Runoff and EROSion Model (KINEROS2; Smith et al., 1995; http://www.tucson.ars.ag.gov/kineros/). AGWA operates on two scales with these models, a river-basin scale with SWAT and a sub-basin scale with KINEROS2. AGWA prepares input files for the models using standardized spatially-distributed datasets such as elevation, soils, and land cover data; typically these data are available on the internet free of charge (Figure 1). To make AGWA readily accessible to a wider audience, multiple soil survey and land cover data formats are supported (e.g. STATSGO, SSURGO and FAO soils and MRLC and NALC land cover data). User-defined land-cover classifications may also be used. Observed rainfall and design storms are used for precipitation inputs for SWAT and KINEROS2 respectively. After model runs are complete, results are imported back into the GIS for spatial display. Output from two simulations, for example using land cover data from two different decades, can be compared and spatially displayed.

AGWA version 2.0 and DotAGWA will continue in the footsteps of AGWA and incorporate the same functionality, but will meet additional criteria including a design that: (1) maximizes the capacity to incorporate different types of models, (2) facilitates the interaction between observed and modeled information at multiple scales, and (3) maximizes potential user audiences. AGWA 2.0 will also include the greater flexibility to incorporate user-provided/defined information, and the additional tools for scenario development and the analysis and visualization of model results.



KINEROS Outputs	SWAT Outputs
Channel Infiltration (m^3/km)	Precipitation (mm)
Plane Infiltration (mm)	ET (mm)
Runoff (mm or m^3)	Percolation (mm)
Sediment Yield (kg)	Surface Runoff (mm)
Peak Flow (m^3/s or mm/hr)	Transmission Loss (mm)
Channel Scour (mm)	Water Yield (mm)
Sediment Discharge (kg/s)	Sediment Yield (t/ha)
	Channel Discharge (m^3/day)

Figure 1. Conceptualization of AGWA input variables, model outputs, and results visualization.

Significance of contribution: AGWA has been used in a variety of studies and watershed assessments in a number of different geographies to examine impacts of past land cover change and alternative futures land-use change (Hernandez et al., 2000; Miller et al., 2002a; Kepner et al., 2004). AGWA is also being utilized as a rapid post-fire watershed assessment tool (Canfield et al., 2005; Goodrich et al., 2005) and has been designed to be integrated with the Analytical Tools

Interface for Landscape Assessments (ATtILA), a landscape characterization tool (Hernandez et al. 2003). Recently AGWA was adapted for international use in Mexico and Europe using FAO soils classification (Levick et al. 2005).

Training, documentation, and publication: Training for AGWA has been provided in a number of U.S. locations (Las Vegas, Tucson, Reston, San Diego/Tijuana) and will be provided for the NATO alliance in Bulgaria (September 2005). Complete documentation and information regarding the AGWA assessment tool are provided on two parallel websites (i.e. EPA and USDA/Agricultural Research Service) which reflects the joint research collaboration of the two agencies: http://www.epa.gov/nerlesd1/land-sci/agwa/ *or* http://www.tucson.ars.ag.gov/agwa . Full reference citations, documentation, quality assurance, publications and fact sheets, contact information, and the software itself is also available free of charge at the above sites.

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